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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,868	09/28/2006	Klaus Rose	09997.0138USWO	8198

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EXAMINER	
HORNING, JOEL G	
ART UNIT	PAPER NUMBER
1712	
MAIL DATE	DELIVERY MODE
03/30/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/594,868	ROSE ET AL.	
	Examiner	Art Unit	
	JOEL G. HORNING	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-20* is/are pending in the application.

4a) Of the above claim(s) *14-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. In the response of January 8th, 2010, applicant has: amended claim 9 and cancelled claim 8. Claims 1-7 and 9-20 are currently pending.

Election/Restrictions

2. **Claims 14-20** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on June 22nd, 2009.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. **Claims 1-7 and 9-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodwin et al (WO 03/086031, as supplied by applicant) in view of Swihart et al (US 4447499).

The instant claims are directed towards a method for coating a substrate with an inorganic-organic hybrid polymer material using the dielectric barrier discharge technique comprising the steps of:

a. Introducing a sample between two electrodes
b. Controlling the atmosphere between the electrodes,
c. Generating a plasma discharge between the electrodes,
d. Mixing aerosols containing hybrid organic/inorganic cross-linked pre-polymers formed via sol-gel processing into the plasma discharge.

Goodwin et al is directed towards a process for depositing coatings on substrates. The process is performed in a system where there are two electrodes with a dielectric plate between them which is used to create a plasma discharge (which is what a dielectric barrier discharge is). The atmosphere between the two electrodes is controlled to form a plasma discharge between them. An atomizer is used to introduce an aerosol of a precursor for a coating forming material into the plasma [0019]. A substrate to be treated is introduced between these electrodes while the atmosphere is being controlled to generate a plasma discharge [0051], the aerosol precursor material is introduced into the plasma discharge [0052], so that a coating is deposited on the substrate [0053]. Goodwin et al further teaches using different precursors depending upon the desired film, such as polydimethylsiloxane

precursor (which is a hybrid inorganic/organic pre-polymer which is formed of smaller cross-linked units) [0040], in order to form an inorganic-organic hybrid polymer material (polydimethylsiloxane) [0046], but does not teach how such precursors are formed.

However, Swihart et al is directed towards coating substrates using polydiorganosiloxanes (including methyl) (abstract), and it teaches that these siloxanes can be formed by conventional methods, including hydrolysis/condensation of dimethylsilanes (col 3, lines 45-56), which is a sol-gel processing.

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to form the polydimethylsiloxanes of Goodwin et al by a sol-gel process, since it was a conventionally known process for creating such molecules and would produce predictable results **(claim 1)**.

4. Regarding **claim 2**, Goodwin et al teaches supplying mixtures of its different precursors, including the non cross-linked silane gas with the polydimethylsiloxane precursor [0040].
5. Regarding **claim 3**, aerosols are mixtures of solids or liquids with gases. As shown in figure 3, the aerosol creating spray nozzle **74** produces an expanding fan-like spray [0052], thus the volume fraction of liquid or solid in the aerosol will decrease as the distance from the nozzle increases (the fluid volume is being diluted by an increasing volume of the gas in the aerosol). This is a compositional gradient in the pre-polymer material in the aerosol.

6. Regarding **claim 4**, the Goodwin et al process takes place at atmospheric pressure (abstract), which is within applicant's claimed range.
7. Regarding **claim 5**, Goodwin et al teaches using a frequency of 29kHz [0061], which is within applicant's claimed range.
8. Regarding **claims 6 and 13**, the substrate can be a moving web **(claim 13)** [0017], which can comprise a plastic **(claim 6)** [0042].
9. Regarding **claim 7**, the coating is taught to modify the properties of the surface, compared to the uncoated substrate. For instance, by increasing the hydrophobicity [0046].
10. Regarding **claim 9**, the polydimethylsiloxane could be obtained from tetramethoxysilane. The process would require replacing two opposing methoxy groups with methyl groups, which would produce a dimethylsilane with two silicon-bonded hydrolyzable radicals (the methoxys) which could then be hydrolyzed and condensed via a sol-gel process to form the polydimethylsiloxane precursor material.
11. Regarding **claim 10**, Goodwin et al further teaches that the pre-polymer mixture can also comprise colloidal metals [0046].
12. Regarding **claim 11**, Goodwin et al further teaches supplying helium to the plasma [0032], which can be supplied from a separate source **75** from the aerosol nozzle **74** before it is mixed together in the chamber [0052] (figure 3).
13. Regarding **claim 12**, Goodwin et al further teaches that the precursor may be applied as a liquid [0039].

14. **Claims 3** is additionally rejected under 35 U.S.C. 103(a) as being unpatentable over Goodwin et al (WO 03/086031) in view of Swihart et al (US 4447499) as applied to claim 1, further in view of Chow et al (US 20020031658).

Goodwin et al teaches forming multilayer coatings on its substrates [0044], but does not teach how the interfaces between those layers should be formed.

However, Chow et al is also directed towards the spray deposition of organic-inorganic hybrid materials [0013] through aerosols [0032]. It teaches that by varying the composition of the precursor feedstock supplied during spraying , a fine composition gradient can be formed in the coating (abstract), which increases the compatibility of hybrid multilayered materials [0027] and can enhance the thermal, chemical and mechanical stability of the multilayer coatings and enhance control of their properties [0033].

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to supply a compositional gradient in the supplied aerosol precursor during deposition in order to form graded interfaces between the different layers in a multilayered coating in order to increase the layer compatibility, improve the stability of the resulting film and in order to better control the properties of said film **(claim 3)**.

Response to Arguments

15. Applicant's arguments filed January 8th, 2010 have been fully considered but they are not persuasive.

Applicant first states that a skilled artisan would not reasonably expect to make high quality coatings using precursors made by sol-gel methods. The

applicant provides no specific support for this statement, but only states that the disclosure of prior art references (which are not cited) suggest it. Applicant has provided no reason why the combination would not have been expected to be successful. The examiner contends that Goodwin et al teaches using cross linked pre-polymers (polydimethylsiloxane, for example) in their coating process, but does not teach the specific mechanism by which the pre-polymers are cross linked. Swihart et al teaches that sol-gel processing is a suitable way of crosslinking pre-polymers that are to be then deposited to make a coating. Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to form the polydimethylsiloxane molecules of Goodwin et al by a sol-gel process, since it was a conventionally known process for creating such molecules for the purpose of depositing them in coating processes and the use of those molecules would produce predictable results.

Applicant then argues that the sol-gel process of their application is very specific, in that it uses precursors that have already been crosslinked (e.g. prepolymers). The examiner contends that the polydimethylsiloxane precursors of Goodwin et al are also cross-linked pre-polymers, so this cannot be the basis for a distinction between the prior art and applicant's invention.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "the addition of stabilizers and catalysts") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations

from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant then argues that using sol-gel processing allows the precursor molecules to be designed to have specific functional groups and to have specific properties. The examiner contends that, no matter how it is synthesized, any particular polydimethylsiloxane has specific functional groups and properties.

Applicant then argues that applicant's plasma process produced unexpectedly rapid condensation reactions at low temperatures. Applicant cites page 19 of their specification for support of this. However, on this page, applicant is comparing plasma enhanced deposition of the precursor with non-plasma thermal deposition of the precursors. Thus, the benefit that applicant believes is unexpected is due to the use of plasma to enhance the deposition and not particularly related to whether the precursors were formed by sol-gel methods. Goodwin et al also uses a plasma enhanced process, so it is expected that Goodwin et al also produces these benefits. The argument is not convincing.

Conclusion

16. No current claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL G. HORNING whose telephone number is (571) 270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. G. H./
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792